Modern Concepts of Cardiovascular Disease

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NEUROCIRCULATORY ASTHENIA (DA COSTA'S SYNDROME, EFFORT SYNDROME, IRRITABLE HEART OF SOLDIERS)

INTRODUCTION. *Neurocirculatory asthenia is a condition of ill health characterized by a group of symptoms consisting of dyspnea (often with sighing respiration also), palpitation, precordial pain, exhaustion, dizziness, nervousness, and sometimes tremor, sweating, headache, and syncope, aggravated by effort or excitement, and attending or following infection or physical or nervous strain, especially in "hypersensitive" individuals, who in extreme cases may show the condition more or less constantly with little or no provocation.* It is probably not a specific disease itself. It may occur either alone, that is, as the only manifestation of ill health, or it may complicate almost any disease, including structural heart disease and psychoses or other diseases of the circulatory or nervous systems. In recent years two important questions have been raised: first, does neurocirculatory asthenia exist as a clinical syndrome apart from the infections or exhaustion or anxiety psychoneurosis that it may accompany or follow, and second, is the term neurocirculatory asthenia (introduced by Oppenheimer et al in 1918 — Military Surgeon, XLII, 711) the best designation for the condition as yet devised? It is possible that eventually this state of ill health may be included simply as a part of various conditions such as infections, exhaustion, nervous prostration, or the anxiety neurosis. But until further researches demonstate the wisdom of such a disposal it would appear best to continue to diagnose and treat the condition as a clinical syndrome with various underlying exciting causes. The term itself seems for the time being the best that has been introduced since it expresses both the circulatory and nervous features of the condition without calling it a disease of either system or in fact a disease at all, also without confusing it with the response to effort which may be a normal physiological phenomenon and without limiting the condition to soldiers. Perhaps later it may be more accurately designated according to its pathogenesis, as a disorder of the vegetative nervous system for example, but as yet we cannot in my opinion give it a better label than neurocirculatory asthenia.

HISTORICAL. Hints concerning this condition appear in the medical literature from the earliest times, as for example in the writings of Galen who recognized the influence of effort and of the emotions on the pulse and in the production of palpitation. John C. Williams, early in the nineteenth century, actually in 1836, wrote a book entitled "Practical Observations on Nervous and Sympathetic Palpitation of the Heart Particularly as Distinguished from Palpitation, the Result of Organic Disease" (Longman, Rees, Orne, Browne Co., Nottingham, England). He revived interest in the "nervous" or "irritable heart" and, like others in his time and since, assumed with little or no proof, that nervous heart disorders could eventually lead per se to organic heart disease.

It was, however, DaCosta of Philadelphia, noted clinician and surgeon in the northern armies in our War between the States, who in 1871 in a classic paper in the American Journal of Medical Sciences (LXI, 17) "On Irritable Heart: A Clinical Study of a Form of Functional Cardiac Disorder and Its Consequences" gave the first clear description of neurocirculatory asthenia, which has never, except in minor details, been improved upon. The writer would urge every doctor in civilian and military practice who is likely to see this condition (and this includes nearly every practicing physician) to read DaCosta's paper from beginning to end.

Since DaCosta, important writings on the subject include the book by Sir Thomas Lewis ("The Soldier's Heart and the Effort Syndrome," Paul B. Hoeber, New York, 1st edition, 1919; 2nd edition, Shaw & Sons, London, 1940), and the recent paper by B. S. Oppenheimer ("Neurocirculatory Asthenia and Related Problems in Military Medicine," Bull. N. Y. Acad. Med., 1942, XVIII, 367).

INCIDENCE. There is no way of knowing the frequency of neurocirculatory asthenia, for in slight, unrecognized, or latent form it has not been, nor is it likely to be, recorded for statistical purposes. Only in its severe or well-marked stages does it come to the attention of the medical profession or even to the victims themselves. As a matter of fact it may be best to reserve the term for the rather pronounced cases, for in milder form it is essentially within the normal range of human reaction to average strains of one kind or another.

Neurocirculatory asthenia of pronounced degree is not very common in civilian life, doubtless because those prone to the condition are for the most part able to guard their health by avoiding the effort or nervous strain that would produce disagreeable symptoms. An analysis of 3,000 persons with cardiac symptoms or signs made by T. Duckett Jones and the writer (American Heart Jour., 1928, III, 302) showed an incidence of neurocirculatory asthenia of 12 per cent, of which 303 cases were uncomplicated by heart disease and 62 cases were superimposed on heart disease. In wartime the incidence varies greatly from very few cases among the soldiers in training to a considerable number under the strain of severe combat. Lewis in the second edition of his book entitled "The Soldier's Heart and the Effort Syndrome" stated that "the magnitude of the problems presented by this condition from the standpoint of army wastage, invalidism, and pensioning will be realized when it is known that" in the British army in the first world war not less than "44,000 cases of 'effort syndrome' became pensioners."

It seems likely that a more careful preliminary examination of the recruit in this war to exclude those with or prone to higher grades of the disorder will result in a decrease in the number both under training and under combat conditions, but there doubtless will continue to crop out in the future many soldiers with neurocirculatory asthenia when the fighting gets rough enough.

ETIOLOGY. Sex. Females are somewhat more prone than males to develop neurocirculatory asthenia but the special strains on the soldier in combat result in a considerable preponderance of males with this condition in wartime.

Age. Before adolescence begins neurocirculatory asthenia is apparently very rare if it occurs at all, but it spares no age after puberty. Proverbially the condition is most common in young adults but that may be in part at least because such persons will not or cannot avoid factors of strain which precipitate neurocirculatory asthenia; as the subject grows older he learns to take more care of himself but even when aged he may still undergo strains which favor the occurrence of this syndrome.

Heredity. One of the most definite etiological re-

lationships of neurocirculatory asthenia is that of heredity. There is a history of a considerable incidence of nervous and psychic disorders and of the syndrome itself in ancestors and contemporary relatives.

Race. So far as we know all races are subject to neurocirculatory asthenia but the more highly sensitive nervously are thought to be more prone.

Build. Neurocirculatory asthenia is more common in those of slight physical build with long chests and vertical hearts but it is by no means limited to such persons.

Occupation. It may occur in any occupation, but those occupations demanding more prolonged, concentrated and anxious nervous attention are more commonly represented, especially when physical strain is superimposed. Thus the combat duty of the soldier is particularly likely to precipitate it.

Mechanism. The pathogenesis of neurocirculatory asthenia is unknown. The symptoms and signs suggest an imbalance of the autonomic nervous system, more or less constant, requiring little provocation, in certain hypersensitive or congenitally deficient or abnormal individuals; that is, abnormal in this particular although a goodly number appear to be "constitutionally inferior" in other respects too. It may be precipitated in more normal individuals by various kinds and degrees of strain. Psychic as well as physical upsets very likely act reflexly on the autonomic nervous system to produce the symptoms. The exact way in which this happens needs elucidation.

Precipitating Factors. Although the fundamental mechanism of neurocirculatory asthenia is unknown, at least some of the exciting causes are known and are usually quite evident in any given case. Infections, physical exhaustion, nervous prostration, and anxiety alone or in various combinations may be attended or followed by neurocirculatory asthenia. Since in the case of serious infections, the infection itself takes the limelight, the neurocirculatory asthenia is not in itself prominent and is taken for granted as a part of the infectious disease. In mild or very chronic infections neurocirculatory asthenia may overshadow the infection itself. In physical exhaustion neurocirculatory asthenia becomes a fatigue syndrome. In nervous prostration it is often simply labelled neurasthenia, although some neurasthenics are more prone to gastrointestinal disorders (mucous colitis, cardiospasm, gastritis, and duodenal ulcer), or to headache and disorders of the senses. The anxiety neurosis as a precipitating factor is one of the commonest and is sometimes regarded as practically syonymous with neurocirculatory asthenia itself, but it must be remembered that the fear of heart disease, resulting in a definite cardiac neurosis, is often unaccompanied by any of the symptoms of this syndrome of neurocirculatory asthenia. More study is needed to ascertain the relative frequency of these exciting factors as well as to unravel the pathogenesis itself.

Pathology. As yet no pathological changes anywhere in the body have been identified with neurocirculatory asthenia.

Symptoms. The characteristic symptoms of neurocirculatory asthenia have already been mentioned in the introductory definition: the most common ones in the order named are dyspnea, palpitation, precordial aching (with or without radiation to the left arm), and a feeling of exhaustion (particularly in the early morning), present more or less constantly during the period but much increased by effort or excitement which normally should not cause such symptoms. The more sensitive the individual to start with, as in ordinary civilian life, the less need be the provocation to bring on a disabling degree of this syndrome, as in the very first drilling as a soldier.

The dyspnea is of two sorts: ordinary shortness of breath on relatively little effort, and frequent sighing which may be so extreme as to cause overventilation with its own chain of symptoms such as faintness, dizziness, and even tetany, and also sometimes electrocardiographic changes, in particular, T wave depression and inversion which may lead to an erroneous diagnosis of heart disease.

The palpitation consists usually of a disagreeable sense of forceful heart action, often rapid but usually regular. Arrhythmias are incidental although they may aggravate the condition or cause a cardiac neurosis per se.

The precordial pain is different from angina pectoris in that it is more of an ache, usually lasts much longer and is more often in the left breast region rather than substernal although it may radiate into the arms and so tend to cause some confusion. Incidentally the pain of neurocirculatory asthenia may coexist with that of coronary insufficiency in the same person.

The sense of exhaustion or faintness is a very prominent symptom and actually the most incapacitating. It may lead to syncope or near-syncope.

Other symptoms are less common or important, but a striking feature of neurocirculatory asthenia is the fact that it is manifested by a *combination of symptoms* rather than by a single one such as pain in coronary heart disease, dyspnea in left ventricular failure, or palpitation in the uncomplicated arrhythmia of an irritable but otherwise normal heart. It may well be that at least some of the symptoms, especially the dyspnea, palpitation, and pain, are largely the subjective discomfort from the simple processes of breathing and heart beating of which the person in good health is normally unaware.

Signs. There are no characteristic signs as compared with symptoms in neurocirculatory asthenia, although there is often tachycardia with flushing and dermatographism, cold moist hands, excessive sweating, and sometimes slight elevation of blood pressure. The heart itself is structurally normal and shows no important murmurs.

Laboratory Findings. No characteristic abnormal laboratory findings have been identified in neurocirculatory asthenia. This includes basal metabolic rate, X-ray study, and electrocardiography.

Course and Prognosis. This syndrome may and usually does come and go according to circumstances, occurring easily in a "sensitive" individual but only rarely, or perhaps only once, in a more "rugged" person when under very heavy strain. It may last hours, days, weeks, months, or years, or indeed even nearly a lifetime in a few persons. It may be totally, partially or not at all incapacitating depending on the degree of the condition, the response to treatment, and the future strains to which a given individual is to be subjected. It does not in itself, so far as we know from past and present experience, lead to thyrotoxicosis (which it may resemble), tuberculosis (which may be mistaken for it), or heart disease (despite theoretical considerations to the contrary). A long life with a variable degree of recurrent trouble from this bothersome condition is to be expected in the average case.

Treatment and Prevention. The principles of both treatment and prevention are four: (1) reassurance about the heart itself and any other serious disease or shortening of life, (2) resignation of the individual to this liability of his, if he has a considerable degree of neurocirculatory asthenia with relatively little provocation, but not the adoption of a state of invalidism, (3) rest (physical and mental) for an acute occurrence or recurrence of the syndrome, and the avoidance of similar strain in the future so far as possible, and (4) re-education with the adoption of a physical and mental program of a useful and happy life that will minimize symptoms of neurocirculatory asthenia. Late hours, tiring contact with crowds of people, hard work without frequent relaxation or holidays, and the excessive use of tobacco, alcohol, tea and coffee are largely to be avoided. No specific therapy consisting of drugs, endocrine extracts, or other measures have as yet been introduced to cure or to prevent this syndrome.

The person especially prone to neurocirculatory asthenia should have as early as possible a clear, sensible, and full explanation of his condition presented to him by his medical advisor in civilian or in military practice so that he may adjust his life to suit, recognizing the bothersome but not serious nature of the handicap.

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